

REMARKS

The Office Action dated October 16, 2002 and the Advisory Action dated May 6, 2003 have been received and carefully noted. Claims 1 and 2 have been amended. In addition, Claims 3 and 4 have been cancelled and Claim 5 has been added. Support for the amendments may be found at page 5, line 29, page 6, line 4, page 6, lines 5-31, and page 8, lines 16-25. No new matter has been added or amendments made which narrow the scope of any elements of any claims. Accordingly, Claims 1-2 and 5 are pending in this application and are submitted for consideration.

Claims 1 and 2 were again rejected under 35 U.S.C. § 103(a) as being unpatentable over JP 11-290,643, in view of pages 14-13 and 18-31 in the Chemical Engineers Handbook (5th Ed.) edited by Perry et. al. The Office Action admits that that the present invention uses a packed column while JP-643 uses a plate column, and that the packing height in the tower ranges from 0.5 to 4 meters. To make up for this deficiency, the Office Action cites page 14-13 in the Chemical Engineer's Handbook for the proposition that the packed columns offer an economic advantage for small columns where the diameter of the column is less than 2 feet. Therefore, it was asserted that it would have been obvious to one skilled in the art to modify the process in JP-643 by substituting a packed column for a plate column in order to arrive at the present invention. Applicant respectfully, but most strenuously, traverses this rejection.

As is clear from amended Claim 1, the essence of the present invention resides in the removal of acidic components from an exhaust gas (e.g., a boiler exhaust gas) containing the same by contacting the exhaust gas with seawater using an absorption gas provided with both a perforated plate and a packed filler under the specified

condition, wherein the used seawater can be directly discharged to the ocean, after oxidizing the absorbed acidic component in the seawater with air, followed by mixing with raw seawater, without using any chemicals. This is completely absent in JP-643 and there is no suggestion to modify JP-643 in view of the Chemical Engineer's handbook.

In addition, JP-643 neither teaches the use of the present absorption column (i.e., a perforated plate column + a packed column) nor the discharge of the used seawater to the ocean, without using any chemicals, simply after the oxidation of the absorbed acidic component in the seawater with air, followed by mixing with raw seawater. JP-643 uses a plate column for the treatment of an exhaust gas and also uses sodium hydroxide for the discharge of the used seawater to the sea.

Further, the Chemical Engineer's Handbook neither teaches the use of the present absorption column composed of a combination of a perforated plate column and a packed column, nor the use thereof under the specified conditions as defined in Claim 1. In addition, neither the use of the seawater for the treatment of the exhaust gas with seawater, nor the release of the used seawater to the ocean, without use of chemicals, simply after the oxidation with air and mixing with raw seawater is taught by this reference.

As such, there is no suggestion in the art to use the Chemical Engineers Handbook to modify the primary reference to arrive at the present invention. Consequently, the present invention would not have been obvious to one of ordinary skill in the art.

The Office Action also references U.S. Patent No. 5,690,899 (Makkinejad, et al.) in response to Applicant's argument that JP-643 does not teach or suggest the second contact with raw seawater after oxidation. However, the '899 patent also does not teach the use of the present absorption gas, nor the use thereof under the specified conditions as defined by the present invention. In addition, the '899 patent does not suggest the release of the used seawater to the ocean, without use of chemicals, simply after the oxidation with air and mixing with raw seawater as is disclosed by the present invention.

In view of the above remarks, the Applicant respectfully submits that each of Claims 1-2 and 5 recite subject matter which is neither disclosed nor suggested in the cited prior art. Applicant submits that this subject matter is more than sufficient to render the claimed invention unobvious to a person of ordinary skill in the art. Applicant therefore requests that each of the pending claims be found allowable, and this application be passed to issue.

If for any reason the Examiner determines that the application is not now in condition for allowance, it is respectfully requested that the Examiner contact, by telephone, the Applicant's undersigned attorney at the indicated telephone number.

In the event this paper is not timely filed, the Applicant respectfully petitions for an appropriate extension of time. Any fees for such an extension together with any additional fees may be charged to Counsel's Deposit Account No. 01-2300.

Respectfully submitted,



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